

SIDOROV, I.S.; IVANOV, P.K.; KABANOV, P.O.; SINITSINA, K., red. STARICHNOV, V.,  
red.; LUKASHNICH, V., ~~tekhn.~~ red.

[Cropping practices in the Southeast] O sisteme zemledel'ia na  
Iugo-Vostoke. [Saratov] Saratovskoe knizhnoe izd-vo, 1956, 139 p;  
(Volga Valley--Agriculture) (MIRA 11:10)

KABANOV, Petr Grigor'yevich; KATSNEI'SON, S.M., red.; ATHOSHCHENKO, L.Ye.,  
tekhn.red.

[The struggle with droughts] Bor'ba s zasukhoi. Moskva, Izd-vo  
"Znanie," 1959. 31 p. (Vsesoiusnoe obshchestvo po rasprostraneni  
politicheskikh i nauchnykh znani. Sel'skoe khoziaistvo, 5)  
(Droughts) (MIRA 12:2)

KABANOV, P.G., kand. sel'khoz. nauk, red.; POPUGAYEV, M.M., kand. ekon. nauk, red.; GORBACHEV, A.P., nauchnyy sotr., red.; LAPIDUS, M.A., red.; DEYEVA, V.M., tekhn. red.

[Farming system in the Southeast] Sistema vedeniia sel'skogo khoziaistva na Iugo-Vostoke. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1950. 428 p. (MIRA 14:7)

1. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk imeni V.I. Lenina. 2. Nauchno-issledovatel'skiy institut sel'skogo khozyaystva Yugo-Vostoka (for Kabanov, Popugayev, Gorbachev)  
(V.2ga Valley—Agriculture)

KARANOV, P.G., kand.sel'skokhoz.nauk

Snow retention is an important measure in drought control.  
Zemledelie 8 no.1:30-36 Ja '60. (MIRA 13:4)

1. Nauchno-issledovatel'skiy institut sel'skogo khozyaystva.  
(Droughts) (Snow)

KABANOV, P.G., kand.sel'skokhozyaystvennykh nauk

Academician N.M. Tulaikov and agricultural problems in the  
Volga region. Zemledelie 24 no.7:12-22 J1 '62. (MIRA 15:12)

1. Nauchno-issledovatel'skiy institut sel'skogo khozyaystva  
Yugo-Vostoka.

(Volga Valley--Agriculture)  
(Tulaikov, Nikolai Maksimovich, 1875-)

KABANOV, P.G.

Ways for surmounting droughts. Zemledelie 26 no.2:12-18  
F '64. (MIRA 17:6)

1. Ordena Trudovogo Krasnogo Znameni nauchno-issledovatel'skiy  
institut sel'skogo khozyaystva Yugo-Vostoka.

KABANOV, P.I.

"First explorers of the Far East." L.G.Kamanin. Reviewed by P.I.Kabanov.  
Vop.geog. 31:272-273 '53. (MLRA 7:6)  
(Kamanin, Lev Georgievich, 1904- ) (Far East--Discovery and  
exploration)

Country	: USSR	R
Category	: Diseases of Farm Animals. Diseases Caused by Bacteria and Fungi	
Abs. Jour.	: Ref Zhur-Biol, No 23, 1958, No 105827	
Author	: Kabanov, P. I.	
Institut.	: Kazakh Scientific Research Veterinary Institute	
Title	: Effectiveness of Polymicrobial Formol-Alum Precipitated Vaccine Against Bradset and Bradset-like Diseases of Sheep in a Laboratory Experiment*	
Orig Pub.	: Tr. Kazakhsk. n.-i. vet. in-ta, 1957, 9, 300-305	
Abstract	: 12 sheep were subjected twice to vaccination, with an interval of two weeks, against bradset and bradset-like diseases with polymicrobial (obtained from the strains Bacillus perfringens, Vibrio septicus, L.D. Bacillus, B. coli commune) formol-alum precipitated vaccine, in doses of 5 ml. for the first inoculation and 7 ml. for the second. After 75 days, the vaccination	
Card:	1/2	



KABANOV, P.I., doktor 1st. nauk; YERMAN, P.K., kand. 1st. nauk;  
KUZNETSOV, N.V., kand. 1st. nauk; USHAKOV, A.V., kand.  
1st. nauk; ANTONOV, V., red.; ZAKHAROVA, G., mlad. red.;  
NOGINA, N., tekhn.red.

[Outline of the history of the Russian proletariat,  
1861-1917] Ocherki istorii Rossiiskogo proletariata;  
1861-1917. [By] P.I.Kabanov i dr. Moskva, Sotsekgiz,  
1963. 388 p. (MIRA 16:11)  
(Labor and laboring classes)

TULUPNIKOV, A.I.. Prinimali uchastiye: BAKULIN, I.I.; VIKHLYAYEV, A.P.;  
DUBOROV, N.T.; KABANOV, P.N.; PIS'MENNYI, I.G.; POPOV, M.I.;  
SOLOV'YEV, A.V., prof., doktor ekon.nauk, retsenzent; MAKAROV, N.P.,  
prof., doktor ekon.nauk, retsenzent; GORYACHKIN, M.I., kand.nauk,  
retsenzent; OKHAPKIN, K.A., kand.nauk, retsenzent; RUŠAKOV, G.K.,  
kand.nauk, retsenzent; MURATOV, D.G., kand.nauk, retsenzent; CHERE-  
MUSHKIN, S.D., kand.nauk, retsenzent; TOLOV, V.V., retsenzent.

[Economic basis for agricultural administration] Voprosy ekonomicheskogo oboznavaniia sistem vedeniia sel'skogo khoziaistva. Moskva, 1960. 275 p. (MIRA 13:6)

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut ekonomiki sel'skogo khozyaystva. 2. Vsesoyuznyy nauchno-issledovatel'skiy institut ekonomiki sel'skogo khozyaystva (for Bakulin, Vikhlyayev, Duborev, Kabanov, Pis'mennyi, Popov.)  
(Farm manager)

KABANOV, P.S., inzh.; BONETSKIY, L.K., inzh.

Concerning L.I. Dvoskin's article "Auxiliary power supply  
networks for the self-needs of large condensing power plants."  
Elek. sta. 34 no.10:89-90 0 '63. (MIRA 16:12)



KABANOV, S.D., inzh.; RECHMENSKIY, I.N., kand.tekhn.nauk

New method for calculating tolerances in machining. Vest.mash.  
42 no.1:56-61 Ja '62. (MIRA 15:1)

(Tolerance (Engineering))

KABANOV, S.D., inzh.; RECHMENSKIY, I.N., kand.tekhn.nauk

Example of the use of theoretical probability calculation method  
in determining operational dimensions and allowances for machining.  
Vest.mashinostr. 42 no.6:54-56 Je '62. (MIRA 15:6)  
(Machine-shop practice) (Probabilities)

VOROB'YEV, Yu.A., kand. tekhn. nauk; BEZHELUKOVA, Ye.F., kand.  
tekhn. nauk; KABANOV, S.D., inzh., retsenzent; ZYAREVA,  
N.N., kand. tekhn.nauk, red.

[Allowances and fits of plastic parts] Dopuski i posadki  
detalei iz plastmass. Moskva, Mashinostroenie, 1964. 197 p.  
(MIRA 18:1)

KABANOV, S.I.; LEVIN, L.I., redaktor; KRASIL'SHCHIK, S.I., redaktor:  
TOKER, A.M., tekhnicheskii redaktor

[Booklet on safety measures for steel workers on high buildings]  
Pamiatka po tekhnike bezopasnosti dlia verkholasov-montashnikov.  
2. izd. Moskva, Gos. izd-vo lit-ry po stroitel'stvu i arkhitekture.  
1954. 23 p. (MLRA 7:8)

1. Russia (1923- U.S.S.R.) Ministerstvo stroitel'stva. Otdel  
tekhniki bezopasnosti i promyshlennoy sanitarii.  
(Building, Iron and steel--Safety measures)



GUBANOV, I.A., starshiy nauchnyy sotrudnik; KABANOV, S.M., starshiy nauchnyy sotrudnik

New plants containing alkaloids from the flora of the Tien Shan. Apt. delo 8 no.5:40-42 S-O '59. (MIRA 13:1)

1. Prsheval'skaya sonal'naya opytnaya stantsiya Vsesoyuznogo instituta lekarstvennykh i aromaticeskikh trav (VILAR).  
(TIEN SHAN--BOTANY, MEDICAL) (ALKALOIDS)

ZAKHAROV, A.M.; KABANOV, S.M.

Active substances of some species of plants of the Tien Shan flora.  
Apt. delo 13 no.5:29-33 S-0 '64. (MIRA 18:3)

1. Przheval'skaya zonal'naya opytnaya stantsiya lekarstvennykh  
rasteniy Vsesoyuznogo nauchno-issledovatel'skogo instituta le-  
karstvennykh i aromaticeskikh rasteniy.

KABANOV, S.S.

**AUTHOR:** Kabanov, S.S., Candidate of Technical Sciences 135-10-1/19

**TITLE:** Shielded Butt-Welding of Thick-Walled Pipes of Large Cross-Section (Stykovaya svarka tolstostennykh trub bol'shogo sечeniya s primeneniyeм zashchitnoy sredy)

**PERIODICAL:** Svarechnoye Proizvodstvo, 1957, No 10, pp 1-7 (USSR)

**ABSTRACT:** The article contains the description of a fusion welding technology using shielding gas for welding pipes of 10,000 - 15,000 mm<sup>2</sup> cross section made of steel grades "20", "20X3M1ΦB" and "X7CMT". The 650kva welding machine "YMAK-100", the circuit arrangement of which had been changed as shown by Figures 1 and 2, was used for this purpose. The causes of non-uniform heating of butts were revealed. Beveling of rims at a 5-8° angle or slow feed of butts in the initial stage of pre-heating are recommended. The effects of various shielding gases on the weld properties were determined and a method of confining the shielding gas to the weld area within the pipes by means of inserted glass wool pads is described (Figure 8). Good results were obtained with gasoline-soaked glass wool layers, placed into the space between the isolating pads - in combination with hydrogen as shielding medium. Satisfactory results were obtained in welding steel "20X3M1ΦB" with the

Card 1/2

KABANOV, S.S.; ZITSER, L.I., konstruktor

Mechanization of operations in the yarn rejection department.  
Tekst. prom. 21 no.10:79-80 O '61. (MIRA 14:10)

1. Nachal'nik tekhnicheskogo otdela kombinata "Bol'shevichka"  
sovnarkhoza Latviyskoy SSR (for Kabanov). 2. Kombinat  
"Bol'shevichka" sovnarkhoza Latviyskoy SSR (for Zitser).  
(Latvia--Textile industry--Equipment and supplies)

KARASEV, I.T.; KABANOV, S.Yo.

Results of treating at the Sochi-Matsesta Health Resort, patients with chronic coronary insufficiency combined with other diseases requiring health treatment. Vop. kur. fizioter. i lech. fiz. kul't. 28 no.3:211-216 My-Je '63. (MIRA 17:5)

1. Iz Sochinskogo sanatoriya imeni Ya. Fabritsiusa (nachal'nik N.N. Chukalin) Ministerstva oborony SSSR.

KOROL', G.Yu., polkovnik; KABANOV, S.Ye., podpolkovnik meditsinskoy sluzhby

Working toward a goal. Voen.-med.zhur. no.11:9-10 '64. (MIRA 18:5)

KABANOV, S.Ye.; GAIKYUK, N.S.; NETRONINA, K.G.

Treatment at Sochi-Mastesta Health Resort of some chronic diseases of the liver, gallbladder and biliary tract with indications for hydrogen sulfide bath therapy. Vop. kur., fizioter. i lech. f'z. kul't. 29 no.4:367-369 J1-Ag '64. (MIRA 18:9)

1. Sochinskiy sanatoriy imeni Ya. Fabritsiusa (nachal'nik N.N. Chukalin).

KABANOV, V., inzh.; MAKAROV, A., svarshchik; STARCHIKOV, A., gornyy inzh.  
(Simferopol')

To the efficiency promotion fund of the seven-year plan. Izobr. i  
rats. no.8:26-27 Ag '59. (MIRA 13:1)

1.Zavod "Santekhdetal'," Ryshkany, Moldavskoy SSR (for Makarov).  
(Efficiency, Industrial)



KABANOV, V., inzh.; SOLOV'YEVA, T., inzh.

Schools on wheels. Okhr. truda i sots. strakh. 3 no. 10:20-21  
0 '60. (MIRA 13:11)

1. Orgtransstroy.  
(Safety education, Industrial)

KABANOV, V., inzh.

Propagandists of the new technology. Sov.profsoluzy 16 no.16:  
29-30 Ag '60. (MIRA 13:8)

1. Tashkentskaya normativno-issledovatel'skaya stantsiya  
"Orgtmansstroy".  
(Railroads--Construction)

KABANOV, V., inzh.

The seven-year plan was fulfilled ahead of time. Na stroi. Ros.

3 no.12:23-24 D '62.

(MIRA 16:2)

(Excavating machinery)

DENYAKIN, Z., kand.tekhn.nauk; KABANOV, V., inzh.; KNIPPENBERG, A., inzh.

Jet pulverizer for slaking lime. Na stroi.Ros. 4 no.6:22 Je '63.  
(MIRA 16:6)

(Lime industry—Equipment and supplies)

KABANOV, V.A.

Accelerated continuous formation for mercury rectifiers with two  
mercury pumps. Prom. Energ., '52, No.10, 6-7. (MLRA 5:10)  
(EEA 56, no.666:2405 '53)

KABANOV, V.A.; GUSEVA, A.G.

The effort to lower the cost of haulage. Zhel.dor.transp. 37 no.4:  
41-45 Ap '56. (MIRA 9:7)

(Railroads--Freight)

KARANOV, V.A., inzh.; FAKTOROVICH, A.M., dotsent

Ways of expanding the field of use of a multirope mine  
hoist with friction pulleys. Izv.vys.ucheb.zav.; gor.shur.  
no.7:121-124 '60. (MIRA 13:7)

1. Leningradskiy ordena Lenina i ordena Trudovogo Krasnogo  
Znameni gornyy institut imeni G.V.Plekhanova. Rekomendovana  
kafedroy gornoy mekhaniki.  
(Hoisting machinery)

KABANOV, V.A.

Safety conditions for braking with multirope sheaves of friction.

Zap. LGI 47 no.1:45-56 '62.

(MIRA 16:5)

(Mine hoisting--Brakes) (Pulleys)



KABANOV, V.A.

Lining materials made of plastic for multirope sheaves of friction.  
Zap. LGI 47 no.1:57-64 '62. (MIRA 16:5)  
(Mine hoisting--Equipment and supplies) (Pulleys)

76-32-3-5/43

**AUTHORS:**

Kargin, V. A., Kabanov, V. A.

**TITLE:**

Investigation of the Structure of the  $\omega$ -Polymer of Methyl Acrylate by Means of Physicochemical Methods (Izucheniye stroyeniya  $\omega$ -polimera metilakrilata fiziko-khimicheskimi metodami)

**PERIODICAL:**

Zhurnal Fizicheskoy Khimii, 1958, Vol 32, Nr 3, pp 520-527 (USSR)

**ABSTRACT:**

Following the conceptions on the reaction mechanism of the  $\omega$ -polymerization of A. N. Pravednikov and Medvedev (Refs 2, 4), experiments were performed by means of radiographic, thermomechanical and sorption methods for the purpose of explaining the structure of the obtained polymers. In radiographic comparative investigations of the  $\omega$ - and  $\mu$ -polymers, it was determined that the sharply marked differences of their properties can not be looked for in the chemical lay-out of the chain structure. The thermomechanical tests were performed on an earlier described dynamometrical scale in a large temperature interval. The samples were preliminarily treated (tableting) in two ways. From the results, it can be seen that no considerable difference of structural lattice density between

Card 1/4

76-32-3-5/43

Investigation of the Structure of the  $\omega$ -Polymer of Methyl Acrylate by Means of Physicochemical Methods

the  $\omega$ - and the  $\mu$ -polymer exists, and that the three-dimensional lattice of both polymers is quite sparse. By the aid of the device according to Aleksandrov and Gayev (Ref 6), measurements of the deformation quantities of both polymers were performed, and the coincidence of the results was assumed to confirm the statements on the character of the lattice structure of these polymers. The investigation of sorption of the methyl propionate hydrated monomer of methyl acrylate in  $\omega$ - and  $\mu$ -polymers was performed on an earlier described device. In the experiments with low relative vapor pressure of the methyl propionate, a better sorption of the  $\omega$ -polymer was observed, which fact is explained by its content of micro-cavities. The assumption of a different chain mobility of both polymers is explained by fixed structural stresses in the  $\omega$ -polymer, corresponding to the mechanism of the  $\omega$ -polymerization according to A. N. Pravednikov and S. S. Medvedev. By means of the last-mentioned assumption, also, the difference of both polymers at higher deformation stresses is represented. The test carried out with longer heating during the sorption investigations showed no particular destruction of the  $\omega$ -polymer, which fact

Card 2/4

76-32-3-5/43

Investigation of the Structure of the  $\omega$ -Polymer of Methyl Acrylate by Means of Physicochemical Methods

is taken as a confirmation of the mentioned fixed chain stress. For the purpose of obtaining a transformation of the  $\omega$ -polymer into a relaxed structure without micro-, or macro-cavities, as in the  $\mu$ -polymer, tests were performed on  $\omega$ -polymers by means of plasticisation, heating in air and exposure to  $\gamma$ -rays of radioactive  $\text{Co}^{60}$ . The plastification showed a destruction of the  $\omega$ -polymer, as did heating. A subsequent irradiation of the soluble products by means of  $\gamma$ -rays in vacuum caused a reconstruction of the lattice, without however the stress characteristic of  $\omega$ -polymers, and proved a real transformation into a  $\mu$ -polymer. A  $\gamma$ -irradiation of  $\omega$ - and  $\mu$ -polymers in the vacuum showed no outward modification on the samples. They remained insoluble in acetone, whilst the experiments performed in air showed an oxidative destruction. On the other hand, at increased temperature, under certain conditions, a transformation of the  $\omega$ -structure into the  $\mu$ -polymer took place. There are 6 figures and 11 references, 8 of which are Soviet.

Card 3/4

76-32-3-5/43

Investigation of the Structure of the  $\omega$ -Polymer of Methyl Acrylate by Means  
of Physico- Methods

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova, Moskovskiy  
gosudarstvennyy universitet im. M. V. Lomonosova, Moskva  
(Institute for Physical Chemistry imeni L. Ya. Karpov, Moscow  
State University imeni M. V. Lomonosov, Moscow)

SUBMITTED: July 11, 1956

Card 4/4

KABANOV, V. A., Cand of Chem Sci -- (diss) "Polymerization of Vinyl Monomers Found Lower on the Flowing Line," Moscow, 1959, 11 pp (Moscow State Univ in Lomonosov)  
(KL, 4-60, 115)

KARGIN, V.A.; KABANOV, V.A.; MARCHENKO, I.Yu.

Synthesis and mechanical properties of isotactic polystyrene.  
Vysokom.soed. 1 no.1:94-102 Ja '59. (MIRA 12:9)

1. Khimicheskiy fakul'tet Moskovskogo gosudarstvennogo univer-  
siteta im. M.V.Lomonosova, Kafedra vysokomolekulyarnykh soyedineniy.  
(Styrene)

KARGIN, V.A.; KARANOV, V.A.; ZUBOV, V.P.

Polymerisation in systems obtained by the molecular beams.  
Vysokom.sped. 1 no.2:265-268 F '59. (MIRA 12:10)

1. Moskovskiy gosuniversitet im. M.V.Lomonosova, Khimicheskiy  
fakul'tet, Kafedra vysokomolekulyarnykh soyedineniy.  
(Polymerisation)



KARGIN, V.A.; KABANOV, V.A.; ANDRIANOVA, G.P.

Heterogeneous polymerization of sodium acrylate in the presence  
of other salts. Vysokom.sped. 1 no.2:301-307 F '59.  
(MIRA 12:10)

1. Moskovskiy gosuniversitet im. M.V.Lomonosova, Khimicheskiy  
fakul'tet, Kafedra vysokomolekulyarnykh soedineniy.  
(Acrylic acid) (Polymerization)

KOZLOV, P.V.; KABANOV, V.A.; FROLOVA, A.A.

Some regularities in the development of uniaxial deformation in the crystalline and vitreous films obtained from polyethylene-terephthalate. Vysokom.sped. 1 no.2:324-329 F '59.  
(MIRA 12:10)

1. Moskovskiy gosuniversitet im. M.V.Lomonosova.  
(Polymers) (Terephthalic acid)

KABANOV, V.A.; ZUBOV, V.P.; KARGIN, V.A.

Polymerization of styrene on a Ziegler type catalyst with the aid of  
the molecular beam method. Vysokom. speed. 1 no.9:1422-1427 S '59.  
(MIRA 13:3)

1. Moskovskiy gosudarstvennyy universitet im. Lomonosova.  
(Styrene) (Titanium chloride) (Aluminum organic compounds)

KARANOV, V.A.; SERGEEV, G.B.; ZUBOV, V.P.; KARGIN, V.A.

Electron resonance study of polymerisation in the system acrylonitrile - magnesium, obtained by molecular beam condensation.  
Vysokom.sped. 1 no.12:1859-1861 D '59. (MIRA 13:5)

1. Moskovskiy gosudarstvennyy universitet.  
(Polymerisation--Spectra) (Acrylonitrile) (Magnesium)

5(3)

SOV/20-125-1-31/67

AUTHORS:

Kozlov, P. V., ~~Kabanov, V. A.~~ Frolova, A. A.

TITLE:

A Study of the Deformation of Crystal Films From Polyethylene Terephthalate (Issledovaniye deformatsii kristallicheskikh plenok iz polietilentereftalata)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 1, pp 118-121 (USSR)

ABSTRACT:

The authors chose polyethylene terephthalate for their experiments since its temperature of vitrification ( $\sim 80^\circ$ ) and melting point ( $\sim 265^\circ$ ) largely exceeds room temperature. For this reason all intermediate stages of recrystallization and orientation resulting from deformation are attained by gradual temperature increase, beginning with room temperature. The experiments were made with samples of two different degrees of crystallization, which had been produced by crystallizing an amorphous polyethylene terephthalate film heated at  $115^\circ$  and  $150^\circ$  for thirty minutes. These samples were then deformed (in % of the initial length) by means of a device at various temperatures and various velocities. The radiograph of the neck-like part of a sample deformed at room temperature is shown in a figure. Such a deformation renders the polymer

Card 1/4

SOV/20-125.1-31/67

A Study of the Deformation of Crystal Films From Polyethylene Terephthalate

amorphous. The destruction of the crystals at 80-90° cannot be accompanied by recrystallization, and the intermediate structures are easily fixed during the deformation. With increasing temperature of deformation the orientation of the amorphous neck-like material is gradually improved, but crystallization is not brought about before the range of vitrification temperature has been attained. Deformation of crystal films above the temperature of vitrification renders the processes of recrystallization more and more perfect. For the purpose of obtaining crystals which are accurately oriented with respect to the mechanical field, the amorphous film is to be deformed at a low temperature and then heated in deformed state beyond the temperature of vitrification. Under these circumstances the structure is not mechanically destroyed during crystallization. Further, the authors investigated the dependence between tension and deformation which holds for crystallized polyethylene terephthalate films. The results of the experiment, which was made within a wide temperature range and at deformation velocities differing by the tenfold, are illustrated in a diagram. The pertinent curves pass through maxima of excess tension at moderate temperatures, which in-

Card 2/4

SOV/20-125-1-31/67

A Study of the Deformation of Crystal Films From Polyethylene Terephthalate

dicates the nature of relaxation of the deformation. Similar curves of deformation-tension are also obtained for amorphous polymeric kinds of glass within the range of forced elasticity which confirms Yu. S. Lazurkin's assumption concerning the molecular mechanism of the deformation of crystalline polymers and amorphous polymeric kinds of glass. In the paper under review the authors proved by the direct structural method that the deformation of crystalline polymers passes through the stage in which the sample is rendered amorphous. By use of polymers with a high temperature of vitrification it is possible to separate the stage of "amorphization" from that of recrystallization. The authors thank Academician V. A. Kargin for valuable advice. There are 3 figures and 8 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

PRESENTED: July 12, 1958, by V. A. Kargin, Academician  
Card 3/4

NOTES: 1. DO NOT DISCARD

International symposium on macromolecular chemistry. Moscow, 1960.  
Neshtumarskiy sloupenik po makromolekulyarnoy khimii, 1961, Moskva, 14-18 iyunya  
1960 s; doklady i svyazuyemye. Sektzia II. (International symposium on  
Macromolecular Chemistry Held in Moscow, June 14-18 1960) Papers and Summaries,  
Section II. (Moscow, 14-18 av. 1960) 559 p., 5,500 copies printed.

Sponsoring Agency: The International Union of Pure and Applied Chemistry, Commission on Macromolecular Chemistry

Tech. Ed.: T.J. Pruehert.

**PURPOSE:** This book is intended for chemists interested in polymerization reactions and the synthesis of high-molecular compounds.

**CONTENTS:** This is Section II of a multivolume work containing papers on macromolecular chemistry; the papers in this volume treat mainly the kinetics of various polymerization reactions initiated by different catalysts or induced by radiation. Among the research techniques discussed are electron paramagnetic resonance spectroscopy and light-scattering interpretation. There are summaries in English, French and Russian. No personalilities are mentioned. References follow each article.

Varia, Y.A., and L.A. Platin (USSR). Processes of Polymerization and Grafting on Newly Formed Surfaces

Salobina, A.V.; G.I. Fedorukov, S.M. Skuratov, and A.L. Bonstakova  
(1988). "The Polymerization Process in the Solid Phase"

**15411. L., L. Szarner, Z. Jolly, and M. Szollet-Hungary. Mechanism of the Polymerization of  $\gamma$ -Caprolactam in the Presence of Phosphoric Acid**

Caprolactam, Epsilonolactam, and Gyrrolactam in the Presence of Their Sodium Salts in Homopolymerization, B. J. Ostaszewski, and Wlodzislaw Polonski, Polymerization

James S. Montgomery, L. K. Moore-Orringer and E. Mabry-Poll (Montgomery). Invest-

different alcohols  
acid, Z., and S. Chmielewicz (Poland). Kinetics of the Polymerization

Stochvil, P. Mikh, and I. Sedlakovsk (Czechoslovakia). Use of the translation method in Commission work on the development of the Plan

**Continuous Constant Observation of Polymerization in Particles**

**Y. V. Reddy and B. L. Ling-I**

572 Study of Some Details of the Mechanism of Polymerization Under the Action of Complex Catalysts (1967)

518 Specificity and the Optical Properties of Polymers

Authors: A. D. A. P. Shernik, M. K. Yabovlev, and L. P. Meshcheryeva (USSR).

On Carbonium and Carbonium Polycondensates  
of Gamma Radiation

Insoluble Molecular Dispositions

**Lysozymes in Formulations** 263  
**On the Mechanism of Ionic Polymerization** 263  
**Resoly, E. (Czechoslovakia)** 263

Isaev, Z., and A. Kaida (Szechinlovskis). On the Role of Nonpolar Solvents in the Cationic Polymerization of Isobutylene

22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100  
101  
102  
103  
104  
105  
106  
107  
108  
109  
110  
111  
112  
113  
114  
115  
116  
117  
118  
119  
120  
121  
122  
123  
124  
125  
126  
127  
128  
129  
130  
131  
132  
133  
134  
135  
136  
137  
138  
139  
140  
141  
142  
143  
144  
145  
146  
147  
148  
149  
150  
151  
152  
153  
154  
155  
156  
157  
158  
159  
160  
161  
162  
163  
164  
165  
166  
167  
168  
169  
170  
171  
172  
173  
174  
175  
176  
177  
178  
179  
180  
181  
182  
183  
184  
185  
186  
187  
188  
189  
190  
191  
192  
193  
194  
195  
196  
197  
198  
199  
200  
201  
202  
203  
204  
205  
206  
207  
208  
209  
210  
211  
212  
213  
214  
215  
216  
217  
218  
219  
220  
221  
222  
223  
224  
225  
226  
227  
228  
229  
230  
231  
232  
233  
234  
235  
236  
237  
238  
239  
240  
241  
242  
243  
244  
245  
246  
247  
248  
249  
250  
251  
252  
253  
254  
255  
256  
257  
258  
259  
260  
261  
262  
263  
264  
265  
266  
267  
268  
269  
270  
271  
272  
273  
274  
275  
276  
277  
278  
279  
280  
281  
282  
283  
284  
285  
286  
287  
288  
289  
290  
291  
292  
293  
294  
295  
296  
297  
298  
299  
300  
301  
302  
303  
304  
305  
306  
307  
308  
309  
310  
311  
312  
313  
314  
315  
316  
317  
318  
319  
320  
321  
322  
323  
324  
325  
326  
327  
328  
329  
330  
331  
332  
333  
334  
335  
336  
337  
338  
339  
340  
341  
342  
343  
344  
345  
346  
347  
348  
349  
350  
351  
352  
353  
354  
355  
356  
357  
358  
359  
360  
361  
362  
363  
364  
365  
366  
367  
368  
369  
370  
371  
372  
373  
374  
375  
376  
377  
378  
379  
380  
381  
382  
383  
384  
385  
386  
387  
388  
389  
390  
391  
392  
393  
394  
395  
396  
397  
398  
399  
400  
401  
402  
403  
404  
405  
406  
407  
408  
409  
410  
411  
412  
413  
414  
415  
416  
417  
418  
419  
420  
421  
422  
423  
424  
425  
426  
427  
428  
429  
430  
431  
432  
433  
434  
435  
436  
437  
438  
439  
440  
441  
442  
443  
444  
445  
446  
447  
448  
449  
450  
451  
452  
453  
454  
455  
456  
457  
458  
459  
460  
461  
462  
463  
464  
465  
466  
467  
468  
469  
470  
471  
472  
473  
474  
475  
476  
477  
478  
479  
480  
481  
482  
483  
484  
485  
486  
487  
488  
489  
490  
491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549  
550  
551  
552  
553  
554  
555  
556  
557  
558  
559  
560  
561  
562  
563  
564  
565  
566  
567  
568  
569  
570  
571  
572  
573  
574  
575  
576  
577  
578  
579  
580  
581  
582  
583  
584  
585  
586  
587  
588  
589  
590  
591  
592  
593  
594  
595  
596  
597  
598  
599  
600  
601  
602  
603  
604  
605  
606  
607  
608  
609  
610  
611  
612  
613  
614  
615  
616  
617  
618  
619  
620  
621  
622  
623  
624  
625  
626  
627  
628  
629  
630  
631  
632  
633  
634  
635  
636  
637  
638  
639  
640  
641  
642  
643  
644  
645  
646  
647  
648  
649  
650  
651  
652  
653  
654  
655  
656  
657  
658  
659  
660  
661  
662  
663  
664  
665  
666  
667  
668  
669  
670  
671  
672  
673  
674  
675  
676  
677  
678  
679  
680  
681  
682  
683  
684  
685  
686  
687  
688  
689  
690  
691  
692  
693  
694  
695  
696  
697  
698  
699  
700  
701  
702  
703  
704  
705  
706  
707  
708  
709  
710  
711  
712  
713  
714  
715  
716  
717  
718  
719  
720  
721  
722  
723  
724  
725  
726  
727  
728  
729  
730  
731  
732  
733  
734  
735  
736  
737  
738  
739  
740  
741  
742  
743  
744  
745  
746  
747  
748  
749  
750  
751  
752  
753  
754  
755  
756  
757  
758  
759  
760  
761  
762  
763  
764  
765  
766  
767  
768  
769  
770  
771  
772  
773  
774  
775  
776  
777  
778  
779  
780  
781  
782  
783  
784  
785  
786  
787  
788  
789  
790  
791  
792  
793  
794  
795  
796  
797  
798  
799  
800  
801  
802  
803  
804  
805  
806  
807  
808  
809  
810  
811  
812  
813  
814  
815  
816  
817  
818  
819  
820  
821  
822  
823  
824  
825  
826  
827  
828  
829  
830  
831  
832  
833  
834  
835  
836  
837  
838  
839  
840  
841  
842  
843  
844  
845  
846  
847  
848  
849  
850  
851  
852  
853  
854  
855  
85



KARGIN, V.A.; KABANOV, V.A.; METEL'SKAYA, T.K.

Polymerisation on a potassium - carbon black catalyst. Vysokom.  
soed. 2 no.1:162-165 Ja '60. (MIRA 13:5)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.  
Khimicheskij fakul'tet.  
(Polymerisation) (Potassium) (Carbon black)

81611

S/190/60/002/02/10/011  
B004/B061

5.383/

AUTHORS:

Kargin, V. A., Kabanov, V. A., Zubov, V. P.

TITLE:

Synthesis of Isotactic Polymethylmethacrylate by  
Polymerization of the Frozen Monomer

PERIODICAL:

Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 2,  
pp. 303 - 305

TEXT: This is a continuation of the work of the authors in Refs. 1 and 2. It was established there that methylmethacrylate (MMA) can be polymerized in the solid state if it is condensed in vacuo with magnesium vapor on a surface cooled by liquid nitrogen. The polymerization sets in between -100 and -110°C, proceeds rapidly and even explosively if heat dissipation is insufficient. The polymethylmethacrylate obtained in this way is a homogeneous polymer containing no free magnesium but 0.5 wt% of bound Mg. It forms transparent solutions in toluene and dichloroethane. Fig. 1 shows the thermomechanical curve of such a polymer. Its softening temperature of +50°C is considerably lower than that of

Card 1/2

KARGIN, V.A.; KABANOV, V.A.; PLATE, N.A.; PAVLICHENKO, N.P.

Plasticization of block copolymers of acrylic acid and styrene.  
Vysokom. soed. 2 no. 3:433-440 Mr '60. (MIRA 13:11)

1. Moskovskiy gosudarstvennyy universitet, Khimicheskiy  
fakul'tet.

(Acrylic acid) (Styrene) (Polymers)

83822

S/190/60/002/005/012/015  
B004/B067

15.8105 also 2209

AUTHORS: Kargin, V. A., Kabanov, V. A., Zubov, V. P.

TITLE: Formation of Isotactic Polymethylmethacrylate on Photo-  
polymerization in the System Methylmethacrylate - Zinc  
Chloride //

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 5,  
pp. 765-769

TEXT: Proceeding from papers on the formation of stereoregular polymers (Refs. 1-4) the authors studied the influence exerted by inorganic salts capable of fixing a short-range order on the microstructure of a polymer chain. The experiments were made in a special set of ampoules (Fig. 1). Ampoule 1 contained methylmethacrylate, ampoule 2  $ZnCl_2$ , and ampoule 3 benzoyl peroxide. The dehydration of the reagents by heating and evacuation is described. The monomer was then condensed in ampoule 2. A saturated solution of  $ZnCl_2$  was produced in the monomer and polymerized in ampoule 3 under the action of ultraviolet light of a ПPK-2 (PRK-2) <sup>8</sup>

Card 1/2

83822

Formation of Isotactic Polymethylmethacrylate S/190/60/002/005/012/015  
on Photopolymerization in the System BOO4/BO67  
Methylmethacrylate - Zinc Chloride

mercury lamp at 20°C. The polymer obtained, which was purified by dissolution and reprecipitation, showed isotactic structure. It had a density of 1.22 g/cm<sup>3</sup> and a vitrification temperature of about 65°C, whereas the syndiotactic polymer (Refs. 5, 6) had a density of 1.18 - 1.19 g/cm<sup>3</sup> and a vitrification temperature of 115 - 135°C. The authors discuss the change in the probability of formation of d,l- or d,d- (l,l-) configurations during the polymerization (Figs. 2, 3), caused by the crystal field fixing the short-range order. Isotactic polymerization requires a screw-like structure which is stabilized by ZnCl<sub>2</sub> molecules through complex formation with the ester groups of the polymer radicals and with the monomer molecules (Fig. 4). There are 4 figures and 8 references: 4 Soviet and 4 US. ✓

ASSOCIATION: Mskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 2, 1960

Card 2/2

85423

S/190/60/002/011/022/027  
B004/B060

15.8105  
11.2217  
AUTHORS:

Zubov, V. P., Kabanov, V. A., Kargin, V. A.,  
Shchetinin, A. A.

TITLE:

Effect of Pressure on the Formation of the Microstructure  
of Polymer Chains in the Polymerization Process

PERIODICAL:

Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 11,  
pp. 1722 - 1727

TEXT: The ratio  $k_i/k_s$  of the reaction rates of the formation of isotactic and syndiotactic structures of a polymer can be influenced by stereospecific catalysts, and also, according to T. G. Fox (Ref.1), by the reaction temperature. The authors wanted to study the effect of pressure on the said ratio  $k_i/k_s$ . Proceeding from the theory of absolute reaction rates and taking into account a different compressibility of the initial components and the intermediate complex, they obtained the equation:  $\ln(k_i/k_s) = \delta v_o^* p / RT - \Delta a^* p^2 / 2RT + 2 \Delta b p^3 / 3RT + \ln(k_{oi}/k_{os})$  (7).

Card 1/3

074-2

Effect of Pressure on the Formation of the S/190/60/002/011/022/027  
Microstructure of Polymer Chains in the B004/B060  
Polymerization Process

Here,  $\delta V_0^*$  denotes the difference between the volumes of the syndio-  
tactic and isotactic intermediate complexes at normal pressure,  $\Delta a^*$  is  
the difference between the coefficients of compressibility of the  
initial components,  $\Delta b$  the difference between the coefficients of com-  
pressibility of the intermediate complexes,  $k_{oi}$  and  $k_{os}$  the rate con-  
stants of iso- and syndiotactic addition at normal pressure. The vali-  
dity of this equation was proved experimentally, by way of producing  
polymethyl methacrylate in a pressure range of 2000-7500 atm. The  
vitrification temperature of the polymer dropped with pressure increase.  
Since the isotactic polymer has a vitrification temperature of 50-55°C,  
and the syndiotactic polymer has one in the range of 130-135°C, the  
drop of the vitrification temperature means an increase of the isotactic  
structure content, and thus, an increase of the value of  $k_i/k_s$ . It was  
found by the determination of density  $\rho$  and by taking into account the  
relation  $k_i/k_s = \rho_i(\rho - \rho_s)/\rho_s(\rho_i - \rho)$  that  $k_i/k_s$  increases from 0.33  
at 1 atm to 0.54 at 7500 atm. The isotactic structure content increases

Card 2/3

85423

Effect of Pressure on the Formation of the  
Microstructure of Polymer Chains in the  
Polymerization Process

S/190/60/002/011/022/027  
B004/B060

from 0.25 at 1 atm to 0.35 at 7500 atm. The difference  $\Delta\chi$  of the compressibility coefficients of the iso- and syndiotactic structure was found, by way of experimental data, to have the value of

$6.1 \cdot 10^{-6} - 1.8 \cdot 10^{-10}$  p. A pressure increase leads to a preferential formation of the intermediate complex with denser molecular package. P. P. Kobeko is mentioned. There are 2 figures, 1 table, and 5 references: 2 Soviet, 2 US, and 1 German.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im.  
M. V. Lomonosova (Moscow State University imeni  
M. V. Lomonosov)

SUBMITTED: June 16, 1960

Card 3/3



84828

15.8000 2209 only

S/020/60/134/005/014/023  
B016/B054

AUTHORS: Kargin, B. A., Academician, Kabanov, V. A., Zubov, V. P.,  
and Papisov, I. M.

TITLE: Polymerization of Acetone

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 5,  
pp. 1098-1099

TEXT: On the basis of an approximate estimation of the thermal effect of the polymerization of carbonyl compounds, for instance of acetaldehyde or acetone, the authors find that this polymerization is impossible in the homogeneous liquid phase. The picture is, however, considerably changed if the transition from a monomeric liquid to a system of arranged monomer molecules is effected in the initial state, i.e. if the entropy of the initial system is much reduced. One method of molecular arrangement is freezing. Here, the entropy of the system is reduced during crystallization by the quantity of the melting entropy. This reduction in entropy gives rise to a reduction of the negative polymerization entropy which, at sufficiently low temperatures, may even change its sign. In this case, a

Card 1/3

84828

## Polymerization of Acetone

S/020/60/134/005/014/023  
B016/B054

polymerization accompanied by a negative thermal effect would be possible. Guided by such considerations, the authors attempted the polymerization of acetone on the double bond  $C=O$  by their method (Refs. 5-7). The experiments were carried out in an apparatus and by methods of Refs. 5,6. The initiator used was metallic magnesium whose vapors were slowly condensed in vacuo together with vapors of carefully dried acetone on a surface cooled with liquid nitrogen. The ratio acetone : magnesium was about 200 : 1. A vitrified molecular layer of an acetone-magnesium mixture was precipitated as a condensate on the cooled wall. With growing thickness of this layer, the temperature of the surface of this vitreous layer finally reaches a value at which a spontaneous process of coordinate/regrouping of monomer molecules is setting in. In the absence of initiation centers, this process would lead to a crystallization of the monomeric glass. An instantaneous polymerization sets in, however, due to the mobility of particles originating in the phase transition "disorder - order". The same phenomenon is observed in a gradual temperature increase of the wall used for the condensation. This leads to the formation of the acetone polymer, an elastic white substance which is soluble in its own monomer. Polyacetone is very unstable at room temperature, and decomposes into

X

Card 2/3

04020

Polymerization of Acetone

S/020/60/134/005/014/023  
B016/B054

acetone, e.g. when ground between the fingers. The most stable polymer samples "exist" without oxygen and moisture for a maximum of 10-12 h. However, traces of vinyl acetate increased the stability of the polymer to a certain extent. Qualitative considerations on the formation mechanism of a polymer chain in an arranged system of monomer molecules have recently been made by N. N. Semenov (Ref. 8). It appears that stabilization of polyacetone could be achieved by blocking the active ends of growing polymer chains. This indicates that substances not polymerizing under the usual conditions, might polymerize if a preliminary regular arrangement of molecules of a monomer were achieved, e.g., by a solidification crystallization, as in the case described above. There are 8 references: 5 Soviet and 3 French. ✓

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SURMITTED: July 23, 1960

Card 3/3

S/020/60/135/004/030/037  
B004/B056

AUTHORS: Kargin, V. A., Academician, Mirlina, S. Ya., Kabanov, V. A.,  
Mikheleva, G. A., and Vlasov, A. V.

TITLE: Structure and Properties of Isotactic Polyacrylic Acid and  
of Its Salts

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 4,  
pp. 893 - 895

TEXT: The problem the authors discuss is the study of spatially regular synthetic polyelectrolytes which may be used as model substances of biological polymers. An electron-microscopic examination of the secondary structures of isotactic polyacrylic acid (PAA) and of its salts has been made by means of a JEM-5Y apparatus. PAA was obtained by alkaline hydrolysis of isotactic polyisopropyl acrylate. Thermogravimetric study showed that PAA crystallizes as a hydrate, with two monomeric members sharing one water molecule. The salts were produced by potentiometric titration (glass electrodes,  $\text{M}-5$  (LP-5) tube potentiometer) with  $\text{Ba}(\text{OH})_2$ , NaOH,

Card 1/4

Structure and Properties of Isotactic  
Polyacrylic Acid and of Its Salts

S/020/60/135/004/030/037  
B004/B056

and  $(\text{CH}_3)_4\text{NOH}$ . The following results are given: Isotactic PAA evaporated from 0.01 - 0.0001% aqueous solution upon a colloxylin film showed similar globuli as atactic PAA whose amorphous character was revealed by electron diffraction studies. Crystallization occurred after HCl addition to the dilute solution (0.00001 - 0.0001%). Crystal stacks, spiral bands, and single crystals were observed. Crystallization in the presence of HCl is explained by suppressed dissociation of the carboxyl groups. In acid media, PAA behaves like a spatially regular polymer. Barium salt produced from solutions with pH 4.2 - 10.7 exhibited globuli within the entire pH range. Intrinsic viscosity at pH = 5 was 0.07 for PABa, and 0.12 for PAA. Sodium salt obtained at pH 4.2 - 11.5 showed globuli in the case of low pH, which at pH = 6.75 unrolled as a consequence of increasing dissociation and intramolecular repulsion of the  $\text{COO}^-$  groups. Fibrils were forming. At pH = 7 dissociation was complete, single crystals formed, and intrinsic viscosity reached a maximum. At higher pH, the molecule chains entangled again, and globuli were observed. In the case of tetramethylammonium polyacrylate, fibrils were observed near the neutral point, which

Card 2/4

Structure and Properties of Isotactic  
Polyacrylic Acid and of Its Salts

S/020/60/135/004/030/037  
B004/B056

resembled the structures of biopolymers. Observation of a tetramethyl-  
ammonium polyacrylate film in polarized light and dry air (40 - 60° C)  
showed that the film consisted of intergrown rhombic single crystals,  
100μ in size, with a folded structure. Cooling down to 20° C initiated  
destruction of the crystals by air humidity. Birefringence vanished.  
Re-heating, however, re-established the old crystal structure. From  
these phenomena it is concluded that in the swelled film the mutual  
position of the structural elements remains unchanged. Hence, isotactic  
PAA showed the same structural types as atactic PAA. However, due to  
the regular succession of asymmetric atoms, isotactic PAA showed a greater  
variety in fibril forms approaching the regular structures of biopolymers.  
There are 4 figures and 2 references: 1 Soviet.

ASSOCIATION:

Moskovskiy gosudarstvennyy universitet im. M. V.  
Lomonosova ( Moscow State University imeni M. V.  
Lomonosov)

Card 3/4

Structure and Properties of Isotactic  
Polyacrylic Acid and of Its Salts

S/020/60/135/004/030/037  
B004/B056

SUBMITTED: July 27, 1960

Card 4/4

88732

5.3100

15.8105

S/190/61/003/001/017/020  
B119/B216

AUTHORS: Kargin, V. A., Kabanov, V. A., Mirlina, S. Ya., Vlasov, A. V.

TITLE: Isotactic polyacrylic acid and its salts

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 134-138

TEXT: The present paper treats the synthesis of isotactic (stereoregular) polyacrylic acid (PAA) and its properties. This PAA, the authors hoped, would provide a suitable model corresponding to biological polyelectrolyte systems. PAA was synthesized by the following procedure: Isotactic polyisopropyl acrylate (PPA, Ref. 1), prepared by polymerization of isopropyl acrylate, was hydrolyzed. Hydrolyzation was carried out in various mediums: 1. PPA - H<sub>2</sub>O - KOH, 2. PPA-H<sub>2</sub>O-methanol - KOH, 3. PPA - methanol - KOH, 4. PPA - dioxane - KOH, 5. PPA - H<sub>2</sub>O - dioxane - KOH, 6. PPA - pyridine - KOH, 7. PPA - H<sub>2</sub>O - pyridine - KOH, 8. PPA - dimethyl formamide - KOH, 9. PPA - propyl alcohol - KOH, 10. PPA - H<sub>2</sub>O - propyl alcohol - KOH, 11. PPA - propyl alcohol - toluene - KOH, 12. PPA - H<sub>2</sub>O - propyl alcohol -

Card 1/3



88732

Isotactic polyacrylic acid and its salts ...

S/190/61/003/001/017/020  
B119/B216

- toluene - KOH, 13. PPA - H<sub>2</sub>O - acetic acid - toluenesulfonic acid. The degree of hydrolysis was determined by potentiometric titration or by titration against phenolphthalein. PAA was precipitated by means of hydrochloric acid. Neutralization of PAA with the corresponding bases yielded the polyacrylates of Na<sup>+</sup>, K<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, N(CH<sub>3</sub>)<sub>4</sub><sup>+</sup>, which were studied under a polarization microscope. PAA was also examined thermogravimetrically and by infrared spectroscopy comparing the results obtained with those obtained on atactic PAA. The following conclusions were drawn: The systems 11 and 12 are most suitable for the hydrolysis of PPA. The diffraction pattern of isotactic PAA indicates a crystalline structure. The thermogravimetric study showed that PAA crystallizes as hydrate, two monomeric units of PAA binding one molecule H<sub>2</sub>O, corresponding to a water content of 11.11%. The K<sup>+</sup> and N(CH<sub>3</sub>)<sub>4</sub><sup>+</sup> salts of the isotactic PAA crystallize in the form of well defined single crystals. The electron-microscopic and electrochemical study on isotactic PAA and its salts will be reported in the next publication of the authors. There are 5 figures, 1 table, and 4 references: 1 Soviet-bloc

Card 2/3

88732

Isotactic polyacrylic acid and its salts...

S/190/61/003/001/017/020  
B119/B216

and 2 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 22, 1960

Card 3/3

88733

5.3100  
15.8105

S/190/61/003/001/018/020  
B119/B216

AUTHORS: Kargin, V. A., Mirlina, S. Ya, Kabanov, V. A., Mikhaleva, G. A.

TITLE: Study on the structure of isotactic polyacrylic acid and its salts

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 139-143

TEXT: The study presented is of scientific interest, since polyelectrolytes represent systems in which insignificant influences produce considerable structural and chemical changes, comparable to those met in living nature. The experiments were carried out on isotactic polyacrylic acid, (PAA) (prepared according to Ref. 2) and its  $\text{Ba}^{2+}$ ,  $\text{Na}^+$  and  $\text{N}(\text{CH}_3)_4^+$  salts (obtained by potentiometric titration with the corresponding bases).<sup>3,4</sup> The electron-microscopic studies were performed in a JEM-5Y electron microscope, and potentiometric titration in a  $\text{MII}-5$  (LP-5) electronic potentiometer. The molecular weight (60,000) of the polymer was determined viscosimetrically (using 0.5 N NaCl as solvent). Preparations for electron-microscopy were prepared by evaporating drops of 0.01 - 0.00001% aqueous solutions of

Card 1/3

88733

S/190/61/003/001/018/020

B119/B216

Study on the structure of isotactic...

the substance on suitable carriers. The experimental results were compared with the results obtained on atactic PAA. Both isotactic PAA, and its salts, and atactic PAA were found to be of two basic structural types: globular (compact aggregates of molecules) and fibrilliform. Isotactic PAA and its  $\text{Na}^+$  and  $\text{N}(\text{CH}_3)_4^+$  salts (in contrast to atactic PAA and its salts) are able to assume highly regular fibrilliform structures (bands, helices, single crystals) corresponding morphologically to biological polymers. Complete dissociation of the ionizing groups or an entirely undissociated state were found to be prerequisite for the formation of secondary crystalline structures, even at completely regular arrangement of the asymmetric atoms in the polyelectrolyte chain. Titration of 1% aqueous solution of isotactic PAA with NaOH yields a  $\text{pK} = 0.64$  and with  $\text{N}(\text{CH}_3)_4\text{OH}$ ,  $\text{pK} = 1.44$  (provided the dissociation constant of the isolated carboxyl group  $K_0 = 10^{-4.86}$ ;  $\text{pK} = \text{pK}_i - \text{pK}_0$ ). There are 8 figures and 4 references: 2 Soviet-bloc and 1 non-Soviet-bloc.

Card 2/3

88733

Study on the structure of isotactic...

S/190/61/003/001/018/026  
B119/B216

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: July 27, 1960

Card 3/3

KOZLOV, P.V.; KABANOV, V.A.; PLATE, N.A.

International Symposium on Macromolecular Chemistry held in Moscow.  
Vysokom. soed. 3 no.2:328-348 F '61. (MIRA 14:5)  
(Macromolecular compounds—Congresses)

S/190/61/003/002/012/012  
B101/B215

AUTHORS: Kozlov, P. V., Kabanov, V. A., Plate, N. A.

TITLE: The International Symposium on Macromolecular Chemistry in  
Moscow

PERIODICAL: Vysokomolekulyarnyye soedineniya, v. 3, no. 3, 1961, 328-348

TEXT: This is a report on the 14th Symposium on Macromolecular Chemistry, held in Moscow on the suggestion of the USSR and decision of the IUPAC (International Union of Pure and Applied Chemistry), June 14th-18th, 1960. Subject was: synthesis of macromolecular compounds and chemical transformation in polymer-chain molecules. There were 1136 delegates and 279 guests. 846 of the delegates came from the USSR. Altogether 170 lectures and reports were given, 64 of which were attended and discussed by Soviet research workers. Two plenary sessions and 18 sessions of the three sections took place. 8 sessions were held on one day of free discussion. The symposium was opened by the plenary session held in the great hall of the Moskovskiy gosudarstvennyy universitet (Moscow State University). V. S. Fedorov, Chairman of the Gosudarstvennyy Komitet

Card 1/10

The International Symposium...

S/190/61/003/002/012/012  
B101/B215

Soveta Ministrov SSSR po khimii (State Committee of Chemistry of the Council of Ministers USSR), A. N. Nesmeyanov, Academician, and I. G. Petrovskiy, Academician, Director of the Moscow University welcomed the delegates. V. A. Kargin, Academician, chairman of the Organization Committee gave a survey on the main problems of polymer chemistry in his opening speech. Second plenary session: N. N. Semenov, Academician: "The collective interaction in processes of polymerization at low temperatures and in polymers with conjugate bonds". The First Section dealt with problems of synthesizing polymers. Lectures by Soviet-bloc scientists: Ye. A. Mushina, A. I. Perel'man, A. V. Topchiyev, B. A. Krentsel' (USSR) talked about synthesizing stereoregular polymers of ring-containing  $\alpha$ -olefins. Ye. I. Tinyakova, B. A. Dolgoplosk, T. G. Zhuravleva, R. N. Kovalevskaya, T. N. Kuren'gina (USSR): On the synthesis of cis- and transpolymers of dienes on oxide catalysts. A. V. Golubeva, N. F. Usmanova, A. A. Vansheydt (USSR): Synthesis of copolymers from styrene,  $\alpha$ -methyl-styrene, and vinyl naphthalene. T. Ya. Kefeli, G. V. Korolev, Yu. M. Filippovskaya (USSR): On polyester acrylate. The synthesis of these polymers had been developed under the supervision of A. A. Berlin. M. Bogdanecky, I. Mleziva, A. Sternschuss, V. Zvonar (CSR): Copolymerization of styrene with unsaturated polyesters. Ye. N. Zil'berman,

Card 2/ 10



The International Symposium...

S/190/61/003/002/012/012  
B101/B215

A. Ye. Kulikova, N. M. Teplyakov (USSR): Polyesters and their oligomers. M. M. Koton (USSR) gave a survey on the synthesis of new polymers with rings in their chains. A. A. Vansheydt, Ye. P. Mel'nikova, M. G. Krakovyak, L. V. Kukhareva, G. A. Gladkovskiy (USSR): Synthesis and properties of crystalline polymers type poly-p-xylylene and polyphenyl methyl. S. G. Matsoyan, I. A. Arbuzova, Ye. N. Rostovskiy (USSR) on: synthesis of polyvinyl acetals. V. V. Korshak, S. L. Sosin, V. P. Alekseyeva (USSR) on the synthesis of new, linear polymers containing aromatic rings. K. A. Andrianov (USSR): "Polymers with inorganic chains in the molecules". N. S. Nametkin, A. V. Topchiyev, S. G. Durgar'yan (USSR) reported on organo-silicon polymers obtained by Ziegler catalysts of allyl silanes by copolymerization with propylene. G. S. Kolesnikov, S. L. Davydova, N. V. Klimentova, M. F. Shostakovskiy, S. P. Kalinina, V. N. Kotrelev, D. A. Kochkin, G. I. Kuznetsova, L. V. Layne, A. I. Borisova, V. V. Borisenko (USSR): on the synthesis, polymerization and copolymerization of organogermanium and organo tin methacrylates and dimethacrylates. M. M. Koton, T. M. Kiseleva, F. S. Florinskiy (USSR): on organometallic tin and lead compounds. E. Thilo (Eastern Germany): "Essential characteristics of the chemistry of inorganic polymers".

Card 3/10

The International Symposium...

S/190/61/003/002/012/012  
B101/B215

M. V. Vol'kenshteyn (USSR): on biosynthesis. K. T. Poroshin, Yu. I. Khurgin, T. D. Kozarenko, N. I. Prokhorov, N. B. Noskov (USSR): on polycondensation of  $\alpha$ -aminoacid esters in the presence of  $\text{CO}_2$ ; A. V. Volokhina, G. I. Kudryavtsev, S. M. Skuratov, A. K. Bonetskiy on polyamidization in solid phase. J. A. Mikes (Hungary) reported on condensation resins obtained from furfurole, phenol, and their derivatives, and formaldehyde. M. S. Akutin, L. A. Rodovilova, N. V. Mikhaylov, V. I. Mayborod, S. S. Nikolayeva (USSR), and L. A. Alexandru, L. D. Dascalu (Roumania) talked about interface polycondensation. F. Lešek, R. Hroměček (ČSR) reported on the process of suspension polymerization and its physicochemical description; A. A. Blagonravov, G. A. Levkovich, I. A. Pronin (USSR) on the catalytic effect of  $\text{ZnO}$  in the synthesis of polyurethanes. The Second Section dealt with processes of polymerization and polycondensation. 59 lectures were given in six sessions. S. Ye. Bresler, E. N. Kazbekov, Ye. M. Saminskiy (USSR) reported on studies on the reactivity of macroradicals by epr; Kh. S. Bagdasar'yan, Z. A. Sinitsina (USSR) and F. Tüdes, I. Kende, M. Azori (Hungary): on the inhibition of radical polymerization by aromatic compounds; G. A. Razuvayev, L. M. Terman, V. R. Likhterov, V. S. Etlis (USSR) on the

Card 4/10

The International Symposium.....

S/190/61/003/002/012/012  
B101/B215.

decomposition of peranhydrides and peresters; A. L. Klebanskiy, O. A. Timofeyev (USSR) on reactions of hexafluoro butadiene-1,3. L. M. Pyrkov, S. Ya. Frenkel' reported on "Hybrid polymers"; D. Hardy, K. Nitray, G. Kovacs, V. P. Li (Hungary) on the kinetics of radical polymerization of vinyl monomers in the presence of  $\text{SiCl}_4$ . T. Krishan, M. F. Margaritova (USSR) talked about emulsion polymerization. A. Ryšanek, M. Hloušek (CSR) reported on the polymerization rate of a particle during emulsion polymerization; F. Hrabek, J. Zahoval (CSR) on the kinetics of emulsion polymerization of chloroprene; E. Turska, G. Wisniewski (Poland) on the redox potential in emulsion polymerization. Z. Maniasek, A. Jerabek (CSR) reported on the emulsion polymerization of styrene and chloroprene; I. Selinger (CSR) on studies on the kinetics of dispersion polymerization. Yu. L. Spirin, D. K. Polyakov, A. R. Gantmakher, S. S. Medvedev (USSR) on polymerization in the presence of organoalkali compounds. A. A. Korotkov, S. P. Mitsengendler, V. N. Krasulin (USSR) on the polymerization of methyl methacrylate in the presence of butyl lithium. M. Kučera, M. Jelinek, J. Lanikova (CSR) on chain ruptures in anionic polymerization of octamethyl cyclotetrasiloxane. Z. Macháček, J. Mejzlik, J. Patz (CSR) reported on the effect of the ratio catalyst : water on the polymerization

Card 5/10

The International Symposium...

S/190/61/003/002/012/012  
B101/B215

rate. K. Vesely (CSR) on cationic and anionic polymerization. Z. Zlamal, A. Kazda (CSR) on the effect of non-polar compounds on the cation polymerization of butylene. R. Mihail, J. Cherskovici (Roumania) on the formation of stereoregular polymers. A. Szimon, Gy. Heims (Hungary) on the polymerization of ethylene in the presence of  $TiCl_4$ ,  $(C_2H_5)_3Al$  or  $(C_2H_5)AlCl$ . O. Wichterle, M. Marek, I. Trekoval (CSR) on Ziegler catalysts for the polymerization of isobutylene. A. V. Topchiyev (USSR) reported on the polymerization on oxide catalysts and experimental data obtained in the in-t Neftekhimicheskogo sinteza AN SSSR (Institute of Petrochemical Synthesis of AS USSR). V. Bocek (CSR) on the propylene polymerization by modified Ziegler catalysts. The effect of organometallic catalysts was also studied by K. Vesely, J. Ambroz, R. Vilim, O. Gamrik (CSR), B. L. Yerusalimskiy, Wang Fo-sung, A. P. Kavunenko (USSR), I. Szanto, K. Hala (Hungary), S. Ye. Bresler, M. I. Mosevitskiy, I. Ya. Poddubnyy, Shih Kuan-i (USSR), B. A. Dolgoplosk (USSR) reported on disturbances in the structure of chains in the ion polymerization of dienes. V. N. Tsvetkov, S. Ya. Magarik, N. N. Boytsova, M. G. Okuney, T. M. Birshteyn, Yu. Ya. Gotlib, O. B. Ptitsyn (USSR): on physicochemical Card 6/10

The International Symposium...

S/190/61/003/002/012/012  
B101/B215

methods of determining stereo-characteristics of macromolecules. V. A. Kargin, V. A. Kabanov (USSR): on the polymerization of insoluble, molecular, disperse substances. A. D. Abkin, A. P. Sheynker, M. K. Yakovleva, L. P. Mezhirova, (USSR) on radiation polymerization in liquid phase. The Third Section dealt with problems of chemical transformations in polymer chains. T. Rabek, Z. Kosmider (Poland) reported on the chlorination of phenol-formaldehyde resins by sulfuryl chloride. A. Ya. Yakubovich, T. Ya. Gordon, L. I. Maslennikova, Ye. M. Grobman, K. I. Tret'yakova, N. I. Kokoreva (USSR): on the transformation of polycarbonates. G. I. Kudryavtsev, Ye. A. Vasil'yeva-Sokolova, I. S. 'Mazel' (USSR): on the interaction of poly- $\alpha$ -chloro-methyl methacrylate by amines. Z. Volkober, T. Holly, G. Turcozo (Hungary): on the interaction of substituted aromatic amines by polyvinyl chloride. I. M. Fingauz, A. F. Vorob'yeva, G. A. Shirokova, M. P. Dokuchayeva (USSR): sulfurization of the polymer during alcoholysis of polyvinyl acetate. B. A. Dogadkin, M. S. Fel'dshteyn, E. N. Belyayeva (USSR) reported on vulcanization accelerators. A. A. Berlin (USSR) gave a survey on the polymers with conjugate bonds. A. A. Berlin, V. I. Liogon'kiy, V. P. Parini (USSR) reported on poly-conjugate polymers on the basis of aromatic bisdiazonines. M. A. Geyderikh,

Card 7/10

The International Symposium...

S/190/61/003/002/012/012  
B101/B215

B. E. Davydov, B. A. Krentsel', I. M. Kustanovich, L. S. Polak, A. V. Topchiyev, R. M. Voytenko (USSR): on semiconductor polymers. J. Mikes, L. Kovacs (Hungary): on bipolar ion exchange resins. K. M. Saldadze (USSR) reported on the same subject; Ye. B. Trostyanskaya, I. P. Losev, A. S. Tevlina, S. B. Makarova, G. Z. Nefedova, Lu Hsien-jao (USSR) on the chloromethylation of copolymers of styrene and divinyl benzene. Kh. U. Usmanov, U. N. Musayev, R. S. Tillayev (USSR): on radiation grafting of acrylonitril on polystyrene and polyperchloro-vinyl. I. Szanto, K. Gal (Hungary), Kh. U. Usmanov, B. I. Aykhodzhayev, U. Azizov (USSR) also reported on radiation grafting (acrylonitril on cellulose). M. Lazâr, R. Rado, J. Pavlinec (CSR), G. S. Kolesnikov, Tseng Han-ming (USSR): on grafting by initiators. I. A. Tutorskiy, Z. I. Smelyy, V. M. Bystrov (USSR): on copolymers of butadiene styrene rubber with  $\epsilon$ -caprolactam. A. A. Berlin, Ye. A. Penskaya, G. I. Volkova (USSR): on the formation of starch macroradicals in freezing and melting of aqueous solutions. V. A. Kargin, N. A. Plate (USSR) reported on initiating vinyl polymerization by disperse inorganic substances; R. Rado, M. Lazâr (CSR): polymerization of polyethylene by peroxides. I. Mladenov, I. A. Tutorskiy, B. A. Dogadkin (USSR): action of  $\gamma$ -rays on butadien styrene rubber.

Card 8/10

The International Symposium ...

S/190/61/003/0C2/012/012  
B101/B215

Z. A. Rogovin, V. A. Derevitskaya, Sun T'ung, Chang Wei-kang, L. S. Gal'-braykh (USSR): synthesis of cellulose ethers. I. N. Yermolenko, F. N. Kaputskiy (USSR): synthesis of phosphorated celluloses. V. I. Ivanov, N. Ya. Lenshina, V. S. Ivanova (USSR): influence of the structure of polyglucoside chains on the oxidative transformation of cellulose. V. M. Yur'yev, A. N. Pravednikov, S. S. Medvedev (USSR): reduced rates of oxidation of hydrocarbons in the presence of formic acid or formates. Thermal destruction of polyvinyl chloride under the action of various compounds had been studied by Z. V. Popova and D. M. Yanovskiy (USSR). O. Wichterle, E. Schittler, P. Čefelin (CSR) reported on the destruction of polycaprolactam. M. Kučera, J. Lanikova, M. Jelinek (CSR): destruction of polydimethyl siloxane. E. Thilo, W. Wicker (Eastern Germany): destruction of inorganic polyphosphates. I. Gemery, O. Mlejnek, E. Štimel (CSR): thermal destruction of polyesters. M. B. Neyman, B. M. Kovarskaya, L. I. Golubenkova, A. S. Strizhkova, I. I. Levantovskaya, M. S. Akutin (USSR): on thermal destruction of epoxy resins. L. A. Angert, A. S. Kuz'minskiy (USSR): initiating effect of secondary amines on the oxidation of rubber. I. Kessler, V. Matysek, J. Polaček (CSR): aging of chloroprene. A. N. Pravednikov, Ying Sheng-k'ang (USSR): protective effect of

Card 9/ 10

89991

15.8114

11.2210

S/190/61/003/003/007/014  
B101/B204

AUTHORS: Kargin, V. A., Kabanov, V. A., Zubov, V. P., Papisov, I.M.

TITLE: Initiation of low-temperature polymerization in systems  
that have been obtained by the molecular beam method

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 3, 1961,  
426-434

TEXT: In earlier papers, (Ref. 1: Vysokomolek. soyed. 1, 265, 1959;  
Ref. 2: Vysokomolek. soyed., 1, 1422, 1960; Ref. 3: Vysokomolek.  
soyedineniya, 1, 1859, 1959; Ref. 6: Vysokomolek. soyed. 2, 303, 1960,  
Ref. 4: V. A. Kabanov, Thesis, Moscow, 1960) the present authors showed  
that a few monomers when condensed together with metals, inorganic salts,  
or oxides may enter polymerization upon a cold surface at the melting  
temperature or even below it. When the usual methods are used, these  
substances (metals, salts, oxides) are absolutely inert. It was the  
aim of the present investigation to disclose the initiation in these  
systems. A) The systems monomer + metal: Rapid, explosive polymeriza-  
tion was attained by simultaneous condensation of vaporized magnesium and

Card 1/5

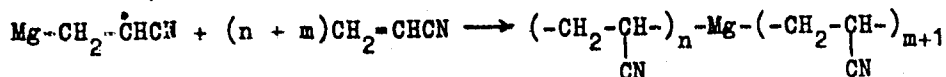


89991

Initiation of low-temperature ...

S/190/61/003/003/007/014  
B101/B204

acrylonitrile, methacrylonitrile, methacrylate, isopropylacrylate, methyl methacrylate, acryloamide, methacryloamide, butylester of ethylene sulfonic acid, dibutylester of vinylphosphinic acid, formaldehyde, acetaldehyde, and acetone upon a surface cooled with liquid nitrogen. The authors employed the arrangement shown in Fig. 1 in order to explain this mechanism. This apparatus may reduce the overlapping of both molecular beams in the gaseous phase in the case of simultaneous condensation of the monomer (1) and magnesium (2) upon the cooled surface (3). It was found that in this case a polymer does not form. Thus, polymerization takes place only when the vapors interact. From epr spectra it was found that free magnesium-organic radicals form when magnesium and acrylonitrile vapor are condensed simultaneously. The analyses showed that the polyacrylonitrile formed under these circumstances contained Mg which could be extracted by hydrolysis with diluted HCl. In this case, the molecular weight (130,000 and 110,000) dropped to about half of its former value. From this, the authors concluded the following course of the reaction:



Card 2/5

89991

Initiation of low-temperature...

S/190/61/003/003/007/014

B101/B204

Further experiments showed that also atomic hydrogen initiates the polymerization of acrylonitrile, methyl methacrylate, and styrene. When Mg was heated on a tungsten spiral up to 2500°C it reacted also with less active monomers, as vinyl acetate. In the same way Zn, Cd, and Hg could be activated. The authors assume that, similar to the results obtained by Steacie (Ref. 9: see end of abstract) and Laidler (Ref. 10: see end of abstract), initiation is due to the excitation of the metal atoms:  $\text{CH}_2=\text{CHR}+\text{Me}^* \rightarrow \text{MeH} + \text{CH}=\text{CHR}$ . Lead or tin vapors do not initiate the polymerization of acrylonitrile, but even hinders it when Mg is present, due to an addition of the free radicals. B) The systems monomer + salt and monomer + oxide: Joint condensation of molecular beams of styrene,  $\alpha$ -methyl styrene, or isoprene with water-free  $\text{BeCl}_2$ ,  $\text{ZnCl}_2$ ,  $\text{TiCl}_3$ , and of the first two compounds with  $\text{MoO}_3$  leads to a rapid polymerization near the melting point of the intensely colored molecular mixture. The formation of  $\pi$  complexes with double bonds is characteristic of the mentioned organic compounds. They only initiate the polymerization of monomers which contain a dense electron cloud at the double bond. The authors assume a cationic mechanism, according to A. R. Gantmakher and S. S. Medvedev (Ref. 11: Vysokomolek. soyed. 1, 1331, 1959). Perfect crystals

Card 3/5

89991

Initiation of low-temperature....

S/190/61/003/003/007/014  
B101/B204

of these catalysts were not very active, whereas polymerization could be brought about at room temperature through vacuum-vaporized crystal films containing enough surface defects. NaCl and KCl do not initiate the polymerization of monomers with electropositive substituents. However, with negatively substituted monomers, as acrylonitrile, polymerization occurred below the melting point of acrylonitrile in the case of joint condensation, when the salt was heated by means of a tungsten spiral. This process is explained by a partial dissociation. Small regions with non-stoichiometric metal atoms in the lattice are forming, and thus F centers which initiate polymerization by giving their electron to the monomer and forming an anionic radical. As the ionization potential of the F center (2.2 v for KCl) is lower than that of a free atom (4.3 v for a K atom), these F centers are intense initiators. The phase of the catalysts and initiators of the investigated systems depends on the ratio of the aggregation rate of the molecularly dispersed catalyst to the rate of polymerization. Thus, a continuous transition from homogeneous to heterogeneous catalysis may be attained. In all the cases investigated the processes were found to be highly specific due to the nature of the monomer and of the catalyst or initiator. There are

Card 4/5

KARGIN, V.A.; KABANOV, V.A.; RAPOPORT-MOLODTSOVA, N.Ya.

Mechanochemical initiation of the polymerization of crystalline acrylic acid salts. Vysokom.soed. 3 no.5:787-793 My '61. (MIRA 14:5)

1. Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova.  
(Acrylic acid) (Polymerization)

15-8050 48123, 2408, 1436

5.4800 1273, 1297, 2209

25717

S/020/61/139/003/016/025

B103/B226

AUTHORS: Kargin, V. A., Academician, Kabanov, V. A., Zubov, V. P., and Zezin, A. B.

TITLE: Polymerization of acetonitrile and other nitriles

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 5, 1961, 605-607

TEXT: The authors proved the possibility of adding another multiple bond ( $C \equiv N$ ) to the bonds undergoing polymerization. This is possible when applying the principle of preliminary ordering of the monomer molecules. Thus, the formation of a new class of polymers having conjugated bonds in the principal chain becomes possible. For this purpose, the authors used nitriles (acetonitrile, propionitrile, tolyl nitrile, benzonitrile, trifluoroacetonitrile, and others). Under standard conditions, polymerization of these compounds on the  $C \equiv N$  bond is not possible, because these bonds should form a  $C=N$ - and a  $C-N$  bond each. In this case, a heat absorption of about 11 kcal/mole would be caused (M. Kh. Karapet'yants, Ref. 2: Khimicheskaya termodinamika (Chemical thermodynamics), M. 1953), without considering conjugation energy. The latter energy, which is

Card 1/6

25717

S/020/61/139/003/016/025  
B103/B226

Polymerization of acetonitrile and...

released in the formation of the bond system  $-C=N-C=N-\dots$  would, at best, cover the deficiency mentioned. In this way, the thermal effect of the reaction would be nearly zero. However, the transition from a liquid monomer to a solid polymer is always accompanied by an entropy decrease ( $\Delta S < 0$ ) (with a change of heat contents  $\Delta H = -Q \approx 0$  and  $\Delta S < 0$  the change of isobaric-isothermal potentials  $\Delta Z = \Delta H - T\Delta S > 0$ ). The authors have ordered the monomer molecules in solid complexes which are readily formed by nitriles with such coordination-unsaturated metal halides as  $ZnCl_2$ ,  $BeCl_2$ ,  $TiCl_4$ ,  $AlCl_3$ ,  $SnCl_4$ . These complexes are crystalline substances of constant composition (usually  $MeX_n \cdot 2RCN$ ). During their formation the entropy of the system is essentially decreased. There is reason to believe that the monomer molecules in these complexes form packings favoring their combination into molecular chains. Heating of these complexes to  $180-350^\circ C$  in hermetically sealed glass ampoules or in the autoclave in the absence of moisture and air oxygen resulted in polymerization of the ordered nitrile molecules with the formation of conjugated

$\dots \overset{R}{\underset{|}{C}} = \overset{R}{\underset{|}{N}} - \overset{R}{\underset{|}{C}} = \overset{R}{\underset{|}{N}} - \overset{R}{\underset{|}{C}} = \overset{R}{\underset{|}{N}} - \dots$  chains. In this process, the metal halide

Card 2/6

25717

S/020/61/139/003/016/025  
B103/B226

Polymerization of acetonitrile and...

plays the part of agents which displace the chemical monomer-polymer equilibrium in favor of the polymer formation. After polymerization the inorganic salt can be washed out by water, ammonia, or acids. Other experiments (heating of nitriles in which only small quantities of the above-mentioned salts are dissolved, 10,000 atm pressure) are unsuccessful, since they lead only to the formation of cyclic trimers. The above-mentioned structural formula of polynitriles is confirmed by data of infrared spectroscopy (Fig. 1). According to the authors' opinion, polymerization proceeds step by step. The molecular weight of the polymer increases with time. The yellow, low-molecular, water-soluble products forming at first gradually become dark brown and black. From the acetonitrile complex with  $ZnCl_2$  heated to  $250^\circ C$  for 5 hr, a dark brown powder is formed, which is soluble in dimethyl formamide. Further heating yields polymers that are soluble only in concentrated (formic, phosphoric, sulfuric) acids. After 10 hr and more, black insoluble polymers are formed. This is confirmed by the increasing viscosity of polymer solutions in  $H_2SO_4$ . Similar relationships can be noted when increasing the reaction temperature. On the assumption that each of the

Card 3/6

Polymerization of acetonitrile and...

25717 S/020/61/139/003/016/025  
B103/B226

polymer chains in the complex increases step by step independently of the other chains, the change of the polymerization degree (P) in time (t) can be written as  $dP/dt = k$  or  $P = kt$ , where, in first approximation, k can be assumed as a constant depending on the temperature and structure of the complex. The intrinsic viscosity is related with P by  $[\eta] = KP^\alpha$ . For very

hard polymers, such as polynitriles,  $\alpha$  is probably  $\sim 2$ . Therefore,

$[\eta] \approx k^2 K t^2 = K t^2$ . In fact, the experimental function  $[\eta]$  of  $t^2$  can be described by a straight line which is extrapolated up to the origin of the coordinates. Polynitriles exhibit a high thermal stability, semi-conductive properties, and the electron paramagnetic resonance spectra characteristic of polyconjugated systems. The electrical conductivity of polymer powders changed within wide limits with good reproducibility on a change of the polymerization temperature. It increases with increasing time and temperature of polymerization. For a temperature increase between 20 and 200°C, conductivity is rigorously changed according to the equation  $\sigma = \sigma_0 e^{-E/RT}$ . The activation energy of electrical conductivity decreases with increasing time and temperature of polymerization between

Card 4/6



Polymerization of acetonitrile and...

25717

S/020/61/139/003/016/025,  
B103/B226

0.35 and 0.2 ev. From the increase in  $\sigma_0$ , the authors conclude that "compensated effects" are absent. There are 3 figures, 1 table, and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: H. J. Emeleus, G. S. Rao (Ref. 3: J. Chem. Soc., 1958, 4245).

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: May 4, 1964 ..

Card 5/6

27878

15.6050

S/020/61/140/001/015/024  
B103/B101

AUTHORS: Kargin, V. A., Academician, Kabanov, V. A., Zubov, V. P.,  
Papisov, I. M., and Kurochkina, G. I.

TITLE: Polycondensation of acetone and other carbonyl-containing  
compounds

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 140, no. 1, 1961, 122-124

TEXT: The authors produced highly stable high-molecular polyvinyls on  
the basis of ketones and aldehydes (acetone; 1,1',1"-trifluoro acetone;  
acetophenone; acetaldehyde, and others). These substances were subjected  
to polycondensation in the presence of comparatively large amounts of de-  
hydrating catalysts such as  $ZnCl_2$ ,  $BeCl_2$ , or  $TiCl_4$ , which are capable of  
forming complex compounds with molecules of monomers. The order of  
monomer molecules in such complexes permits extensive polycondensation  
processes. In previous papers, the authors showed (Vysokomolek. soyed.,  
1, 265 (1959); 1, 1859 (1959); 2, 426 (1961); Internat. Symposium on  
Macromolecular Chemistry, Section 2, M., 1960, p. 453; V. A. Kabanov,  
Dissertation for the degree of candidate, M., 1960) that the ordered  
Card 1/4

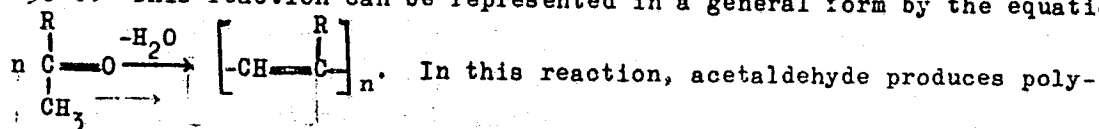
27878

S/020/61/140/001/015/024

B103/B101

Polycondensation of acetone...

position of the monomer molecules may lead to very high, often explosive polymerization rates of solid monomers, even at very low temperatures. S. M. Skuratov's data (A. V. Volokhina, G. I. Kudryavtsev, S. M. Skuratov, A. K. Bonetskaya, Internat. Symposium on Macromolecular Chemistry, Section 2, M., 765, 1960, p. 465) indicate that this order must have an effect also upon polycondensation. The authors achieved the polycondensation by heating the reactant mixtures in sealed glass ampuls or in an autoclave with exclusion of atmospheric oxygen to temperatures from 70 to 250°C. This reaction can be represented in a general form by the equation:



acetylene, acetone produces polymethyl acetylene, acetophenone produces polyphenyl acetylene, and so on. The polymers obtained are dark-brown or black powders with increased heat resistance characteristic of high-molecular, polyconjugate systems. They display semiconductor properties and characteristic epr spectra. The solubility of polymers in organic solvents, such as acetone or benzene, depends on the degree of polycon-

Card 2/4

5.3830

2209

S/020/61/141/002/018/027  
B101/B147

AUTHORS: Kargin, V. A., Academician, Kabanov, V. A., Papisov, I. M.,  
and Zubov, V. P.

TITLE: Role of phase transitions in polymerization processes of  
solid monomers

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 2, 1961, 389-392

TEXT: The problem of rapid polymerization in solid state at low temperatures is discussed. A 0.03 mm thick layer of acrylonitrile (melting point  $-83^{\circ}\text{C}$ ) and magnesium (100 : 1) was condensed in vacuo onto a glass plate which was placed at the face of a copper cylinder cooled with liquid  $\text{N}_2$ . The condensate was a crystal-clear film. After  $\text{N}_2$  was removed the copper cylinder was slowly heated ( $2^{\circ}\text{C}/\text{min}$ ). Temperature was measured with thermocouples, and the thermogram (Fig. 2) was recorded by an ЭПН-09 (EPP-09) electronic voltmeter. Samples activated with Mg underwent explosive polymerization either at  $-160^{\circ}\text{C}$  or at  $-135^{\circ}\text{C}$ . The degree of conversion was 100%. At these temperatures, the thermogram of non-activated acrylonitrile shows exothermic effects. The effect observed at

Card 1/0 3

30704

S/020/61/141/002/018/027  
B101/B147

Role of phase transitions ...

-160°C is ascribed to the crystallization of monomer glass on reaching Tamman temperature. The effect observable at -135°C, and the reason why polymerization starts once at -160° and once at -135°C, are still unexplained. At -135°C a secondary, additional orientation of the resulting microcrystalline substance might take place. The two transitions are irreversible. In methylmethacrylate and Mg condensed onto a glass sphere which was cooled to -75°C (apparatus described in Vysokomolek. soyed., 1, 265 (1959)), the polymerization process in polarized light could be observed due to birefringence of the crystals. At this temperature, the molecules could already migrate and add to the forming crystallization nuclei. Spherulites were formed. The characteristic Maltese cross could clearly be seen. In this system, slow polymerization took place. It began at the edges of the spherulites and in fissures. Shifting of the crystal - polymer interface could be observed with the aid of birefringence which vanished during polymerization. Contrary to N. N. Semenov's hypothesis (Khimiya i tekhnologiya polimerov, no. 7-8, 196 (1960)) that rapid polymerization takes place preferably in ideal crystals, experimental data showed that this effect occurs in defect crystals while ideal crystals polymerize slowly. Lattice defects are

Card 2/3

S/063/62/007/002/002/014  
A057/A126

AUTHORS: Kabanov, V.A., Candidate of Chemical Sciences; Zubov, V.P.

TITLE: New methods for polymer synthesis by polymerization

PERIODICAL: Zhurnal vsesoyuznogo khimicheskogo obshchestva im. D.I. Mendeleeva,  
v. 7, no. 2, 1962, 131 - 140

TEXT: Methods for stereospecific polymerization and new polymers published in literature are discussed, citing in general investigations carried out by the Italian team of G. Natta. The scope of the present discussion is to indicate correlations between basic principles of processes in biosynthesis of macromolecules and those observed in syntheses of polymer materials. Consequently there could be discovered model systems imitating steps of complex biological processes and allowing a better understanding of their nature. Several examples demonstrate that regular polymers with different structural properties can be synthesized by stereospecific polymerization from the same monomer using different stereospecific catalysts. Thus, new possibilities are given for polymer chemistry by employing the principle of structural selection in the production of new polymers from well known monomers. This principle is also realized in living

Card 1/3

New methods for polymer synthesis by polymerization

S/063/62/007/002/002/014  
A057/A126

tone (which is not possible in liquid state), or various oriented nitriles in melts of corresponding metal complexes. Formation of macromolecules of the latter increases the polymerization entropy and effects, apparently, an additional decrease of specific heat. Moreover, orientation of the monomer molecules affects the polymerization rate. Thus can be observed slow (effected by gamma-irradiation), or quick polymerization (near, or considerably below the melting point of the polymer). It can be assumed that high polymerization rates, observed in solid-phase polymerization, are connected to a special mechanism of chain growth possible in systems with oriented monomer molecules. Soviet authors suggested a hypothesis which states the transfer of initiation energy as electron or oscillation excitation along the oriented monomer molecules resulting in the formation of a polymer chain. Excited states are important in biological reactions occurring on matrix catalysts too. There are 2 figures and 49 references: 18 Soviet-bloc and 31 non-Soviet-bloc. The most important English-language reference reads as follows: D.L. Glusker, E. Stiles, B. Goncoskie, J. Polym. Sci., 49, 297 (1961); D.L. Glusker, I. Lisloff, E. Stiles, *ibid.*, 49, 315 (1961).

Card 3/3

KABANOV, V.A., ZUBOV, V.P., KOVALEVA, V.P., KARGIN, V.A.

Polymerization of nitriles and pyridine.

Report submitted for the International Symposium of Macromolecular Chemistry,  
Paris, 1-6 July 63



ACCESSION NR: AT4034000

S/0000/63/000/000/0147/0153

AUTHOR: Zubov, V. P.; Terekhina, I. P.; Kabanov, V. A.; Kargin, V. A.

TITLE: Polymerization of benzonitrile

SOURCE: Geterotsepnnyye vyssokomolekulyarnyye soyedineniya (Heterochain macromolecular compounds); sbornik statey. Moscow, Izd-vo "Nauka," 1963, 147-153

TOPIC TAGS: polymer, benzonitrile, titanium tetrachloride, boron fluoride, zinc chloride, polymerization kinetics, polymerization mechanism, benzonitrile polymer, benzonitrile trimer, polymer spectral analysis

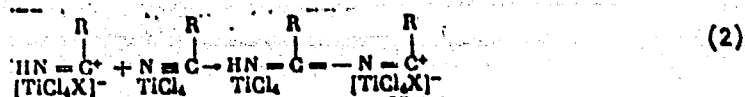
ABSTRACT: Specially purified benzonitrile (b.p. 191.3C/760 mm,  $n_D^{22.5} = 1.5310$ ) was polymerized in a series of reactions, mostly with titanium tetrachloride (134C/735 mm) as well as with zinc chloride or boron fluoride, to determine the mechanism and kinetics of the polymerization process. The structure of the polymerization products is analyzed in terms of the results of an infrared spectral analysis (see Fig. 1 in the Enclosure). Polymerization in the presence of  $HP0_3$  is illustrated by



Card 1/3

ACCESSION NR: AT4034000

for initiation and



for chain growth.  $R = C_6H_5$ . The formation of a trimer, its accumulation and participation in the polymerization process are discussed. Orig. art. has: 3 graphs, 1 illustration and 6 chemical formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova  
(Moscow State University)

SUBMITTED: 01Oct62

DATE ACQ: 30Apr64

ENCL: 01

SUB CODE: OC

NO REF SOV: 005

OTHER: 006

Card 2/3

$\frac{P_0}{P_1} = \frac{P_2}{P_3}$

FILE: POLYMERIZATION OF GLYPHosate MONOAMIDE

temperature of 18-2000°C, depending on the reaction conditions, the formation of both low-molecular and macromolecular compounds. On the basis of the compositions, the molecular weights and the infrared spectra

"APPROVED FOR RELEASE: 07/19/2001

CIA-RDP86-00513R000519810003-4

L 38286-65

End 2.2

APPROVED FOR RELEASE: 07/19/2001

CIA-RDP86-00513R000519810003-4"